

ABSTRACT

An MOV element is physically and electrically connected to a heat sensitive material which changes from a low impedance path to a high impedance path, such as a spark gap, when the temperature of the MOV element rises to a temperature below that at which the MOV will enter into its thermal runaway state. More specifically, the heat sensitive material is located on a surface of the MOV and is electrically connected in series with the MOV. In operation, as the MOV gets hot, it heats the heat sensitive material. As the heat sensitive material gets hot, it starts to separate from the surface of the MOV to form a spark gap which is electrically connected in series with the MOV element to help dissipate excessive voltage. The heat sensitive material on the surface of the MOV element can be a coating of epoxy which cracks and/or breaks away, at least partially from the surface of the MOV element during the occurrence of a high voltage transient surge, or it can be a solder that sputters to form an arc path during the occurrence of a high voltage transient surge. In operation, when a GFCI is subjected to a high voltage transient surge above a certain magnitude, the heat sensitive material forms a spark gap which is in series with the MOV and prevents the GFCI from going into its destructive thermal runaway condition. Thus, prior to the MOV entering its thermal runaway state, it goes from being only an MOV to an MOV in series with a spark gap which can be used to protect an up stream GFCI during the occurrence of a high voltage transient surge.